UC20 EVB User Guide

UMTS/HSPA Series

Rev. UC20_EVB_User_Guide_V1.0

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About the document

History

Revision	Date	Author	Description
1.0	2013-05-31	Jerry You	Initial

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1 Introduction

This document describes **UC20 Evaluation Board Rev.1.01**. The UC20 Evaluation Board is designed to assist system integrator in developing and evaluating products based on Quectel Wireless Modules.

This document gives a detailed description for interfaces of the UC20 module, provides technical specifications and presents guidelines on how to connect UC20 module with UC20 Evaluation Board Rev.1.01 and operate UC20 module.

1.1. Safety Information

The following safety precautions must be observed during all phases of the operation, such as usage, service or repair of any cellular terminal or mobile incorporating module. Manufacturers of the cellular terminal should send the following safety information to users and operating personnel and to incorporate these guidelines into all manuals supplied with the product. If not so, Quectel does not take on any liability for customer failure to comply with these precautions.



Full attention must be given to driving at all times in order to reduce the risk of an accident. Using a mobie while driving (even with a handsfree kit) cause distraction and can lead to an accident. You must comply with laws and regulations restricting the use of wireless devices while driving.



Switch off the cellular terminal or mobile before boarding an aircraft. Make sure it switched off. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. Consult the airline staff about the use of wireless devices on boarding the aircraft, if your device offers a Fight Mode which must be enabled prior to boarding an aircraft.



Switch off your wireless device when in hospitals or clinics or other health care facilities. These requests are desinged to prevent possible interference with sentitive medical equipment.



GSM cellular terminals or mobiles operate over radio frequency signal and cellular network and cannot be guaranteed to connect in all conditions, for example no mobile fee or an invalid SIM card. While you are in this condition and need emergent help, please remember using emergency call. In order to make or receive call, the cellular terminal or mobile must be switched on and in a service area with adequate cellular signal strength.



Your cellular terminal or mobile contains a transmitter and receiver. When it is ON , it receives and transmits radio frequency energy. RF interference can occur if it is used close to TV set, radio, computer or other electric equipment.



In locations with potencially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other cellular terminals. Areas with potencially exposive atmospheres including fuelling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust or metal powders.

2 General Overview

2.1. Key Features

Table 1: Features

Feature	Implementation
Power supply	DC supply 4.5~5.5V VBAT: 3.4V~4.3V at J102
SIM Interface	SIM1 Card (8 pins) connector with front tray loading and support card detection SIM2 Card (6 pins) connector with bottom tray loading and does not support card detection (reserved) Support SIM cards: 3V and 1.8V
Audio Interface	One analog interface for connecting a handset or headset
Serial Interface	Two RS-232 interfaces: COM1-serial interface for data communication (default 115200bps) COM2-serial interface for debug purpose (reserved) Max. baud rate: 460800 bps
USB Interface	High speed
Signal Indication	4 LEDS are available for signal indication
Physical Characteristics	Size: 13.6*10.6 cm

2.2. System Overview

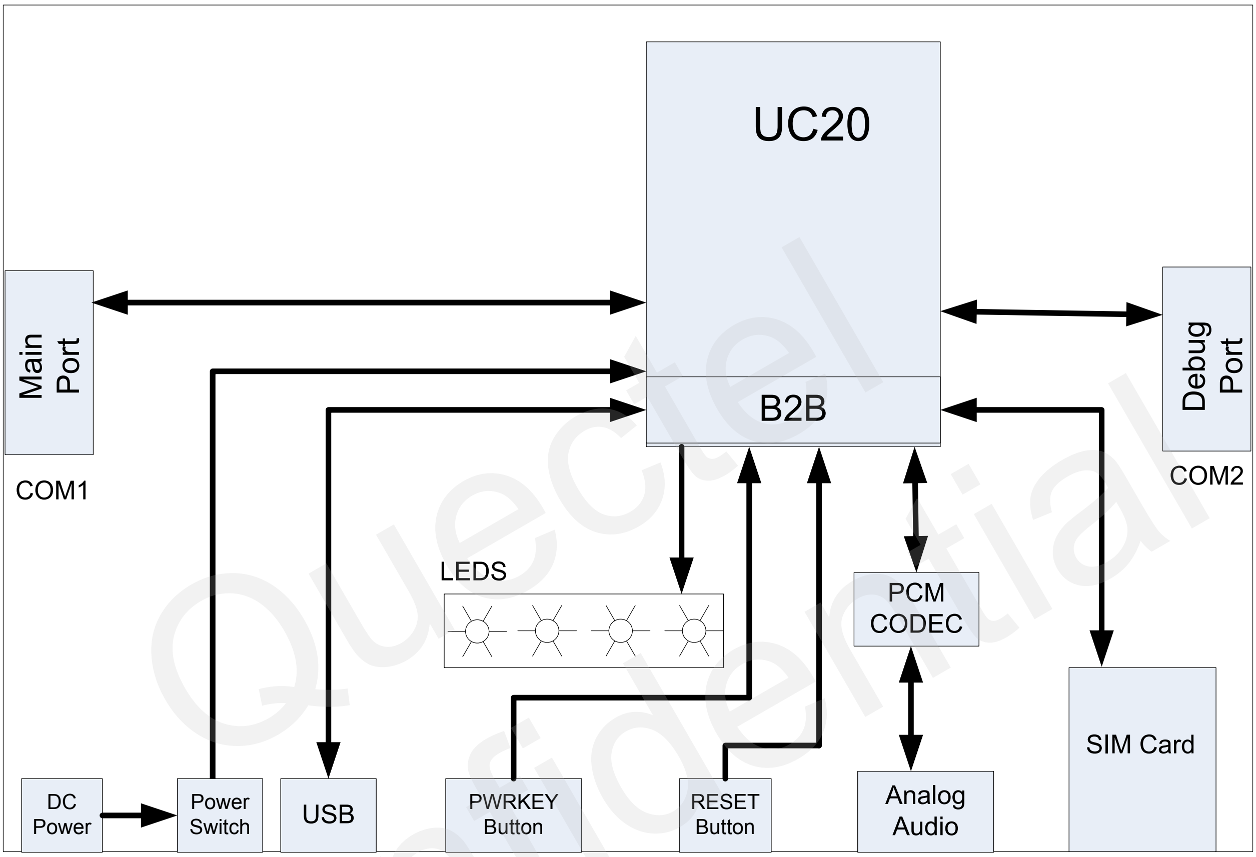


Figure 1: System Overview

2.3. UC20 TE-A and UC20 EVB_V1.01

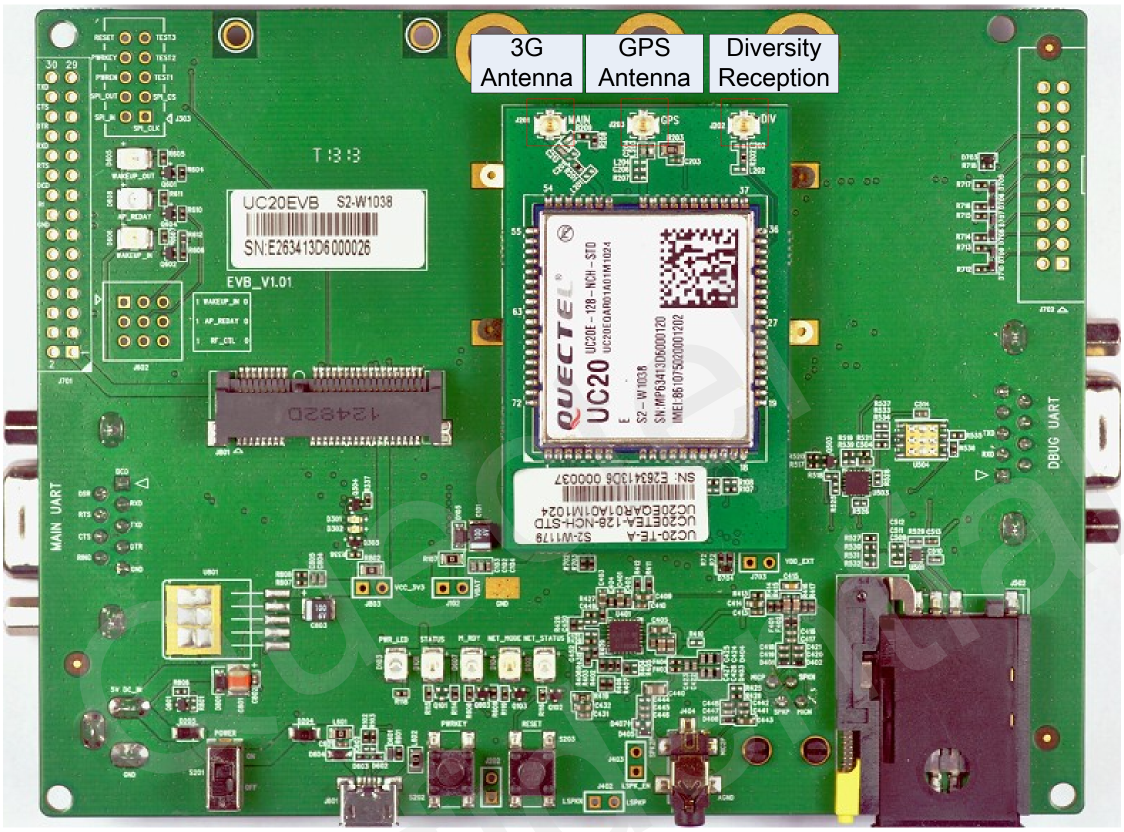


Figure 2: UC20 TE-A and UC20 EVB_V1.01



Figure 3: Accessories

3 Description of UC20 EVB

3.1. UC20 Module Interface (Board to Board Connector)

The Panasonic board-to-board connector on the UC20 EVB_1.01 is a 100-pin double-row receptacle. Several pins are reserved. Table 2 shows the names and positions of the pins on the UC20 EVB_V1.01.

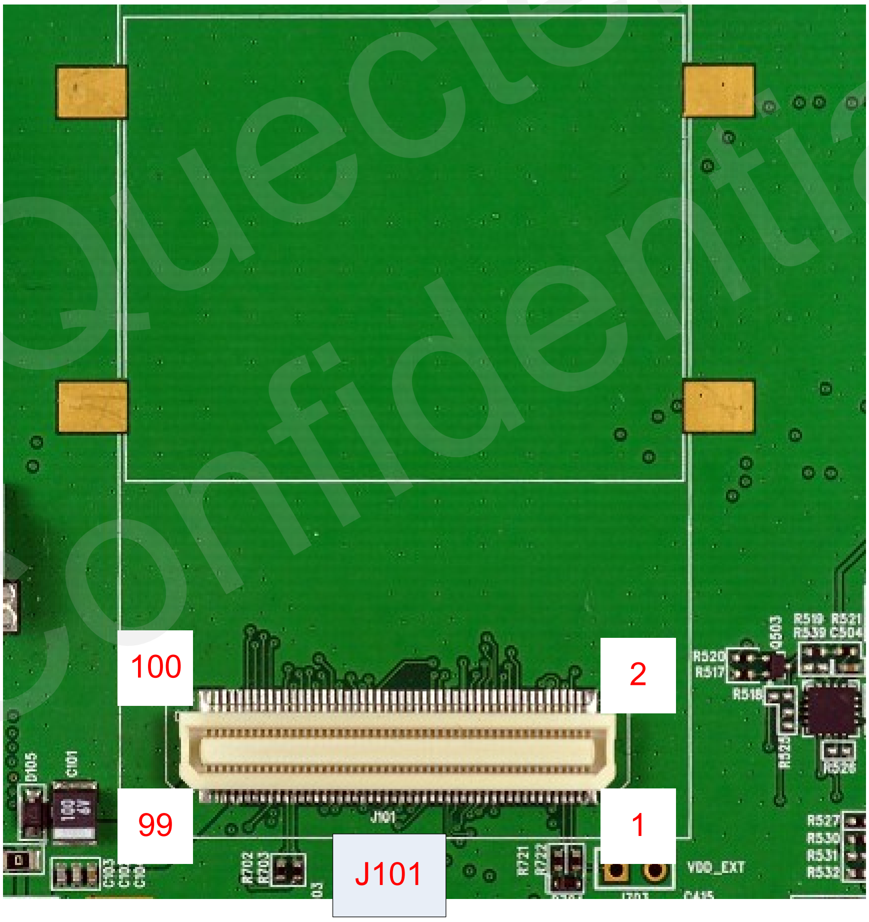


Figure 4: Board to Board Connector

Table 2: PIN Assignment of B2B Connector

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GND
3	GND	4	SIM_GND
5	RESERVED	6	SIM_RST
7	RESERVED	8	SIM_CLK
9	RESERVED	10	SIM_DATA
11	RESERVED	12	SIM_VDD
13	RESERVED	14	SIM_PRESENCE
15	RESERVED	16	GND
17	RESERVED	18	RESERVED
19	RESERVED	20	RESERVED
21	RESERVED	22	RESERVED
23	AGND	24	RESERVED
25	PCM_IN	26	RESERVED
27	PCM_OUT	28	RESERVED
29	PCM_SYNC	30	RESERVED
31	PCM_CLK	32	RESERVED
33	GND	34	RESERVED
35	I2C_SDA	36	RESERVED
37	I2C_SCL	38	GND
39	GND	40	DEBUG_TXD
41	RESERVED	42	DEBUG_RXD
43	RESET_N	44	RESERVED
45	PWRKEY	46	RESERVED

47	GND	48	RESERVED
49	ADC1	50	RESERVED
51	GND	52	RESERVED
53	ADC0	54	GND
55	GND	56	RESERVED
57	RESERVED	58	RESERVED
59	VRTC	60	RESERVED
61	STATUS	62	RESERVED
63	RESERVED	64	GND
65	NET_STATUS	66	VDD_EXT
67	NET_MODE	68	RI
69	RESERVED	70	DCD
71	RESERVED	72	CTS
73	RESERVED	74	RTS
75	GND	76	DTR
77	USB_DP	78	TXD
79	USB_DM	80	RXD
81	GND	82	RESERVED
83	USB_VBUS	84	RESERVED
85	RESERVED	86	RESERVED
87	RESERVED	88	RESERVED
89	RESERVED	90	RESERVED
91	GND	92	GND
93	GND	94	GND
95	VBAT	96	GND
97	VBAT	98	VBAT

99	VBAT	100	VBAT

NOTE

These pins connect directly with UC20 pins.

3.2. Test Points of UC20

Header J701 are the test pins at the UC20 EVB_V1.01. Figure 5 shows the test points.

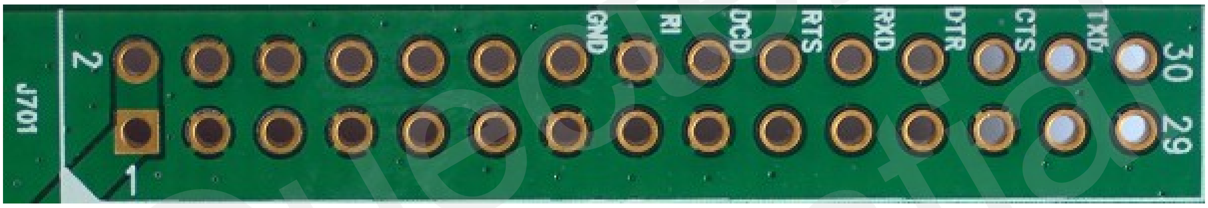


Figure 5: Test Points

Table 3: PIN Assignment

Pin No.	Signal Name
30	TXD
28	CTS
26	DTR
24	RXD
22	RTS
20	DCD
18	RI
16	GND

NOTES

1. These test pins belong to 3.3V power domain which is converted from UC20 Main UART pins.

2. The other pins are reserved.

3.3. SIM Card Interface

The UC20 EVB_V1.01 has two integrated SIM card interfaces. But SIM2 is reserved. A suitable SIM card (3V or 1.8V) is required to start UC20 module. The SIM card holder J502 placed on the UC20 _EVB_V1.01 is from type Molex. Figure 5 shows the simplified interface schematic.

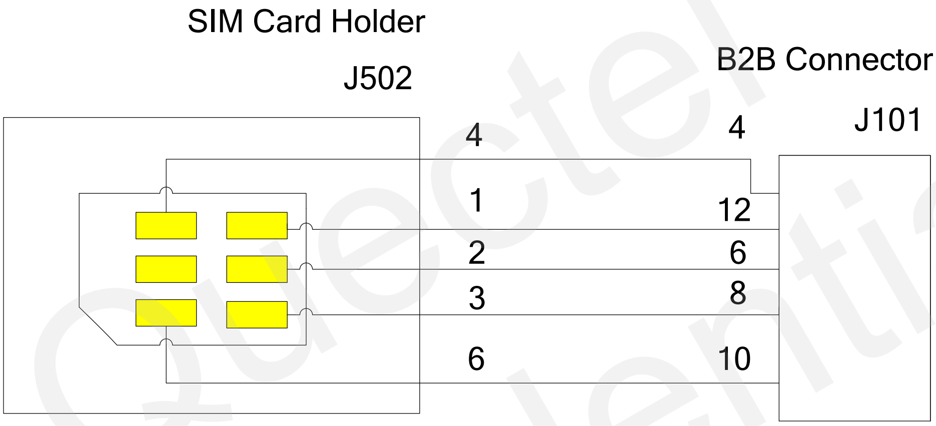


Figure 6: SIM1 Interface

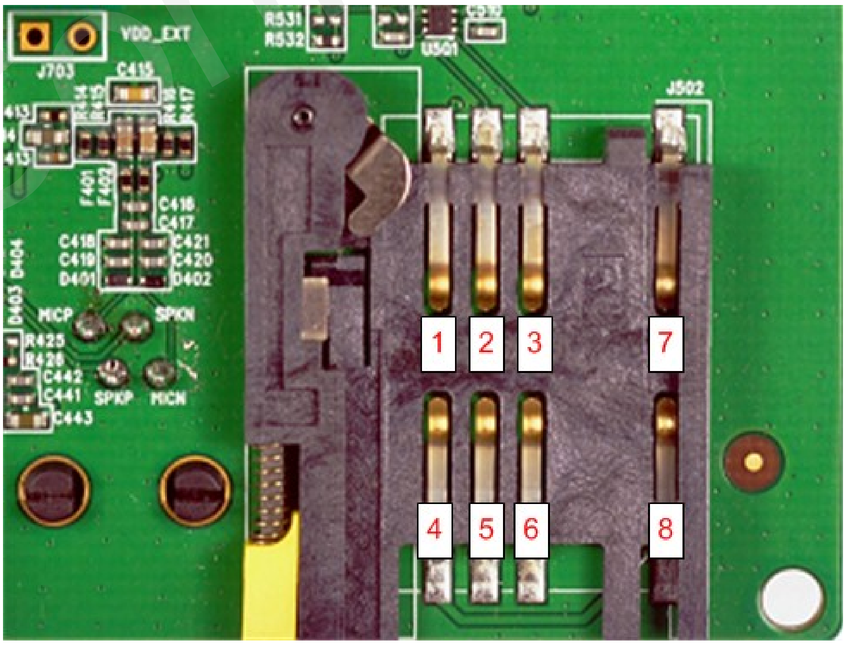


Figure 7: Molex SIM Card Holder

Table 4: Pin Assignment-SIM Card Holder J502

Pin No.	Signal Name	I/O	Function
1	SIM_VDD	O	Supply voltage U=3V or 1.8V for SIM1 card, generated by the module.
2	SIM_RST	O	SIM1 card reset..
3	SIM_CLK	O	SIM1 card clock.
4,8	GND	/	Ground
5	VPP	/	Not connected.
6	SIM_DATA	I/O	Data line, bi-directional
7	SIM_PRESENCE	I	SIM1 card detection.

3.4. USB Device Interface

UC20 EVB_V1.01 provides a USB 2.0 High Speed interface. It is used for AT command, data transfer and firmware upgrading.

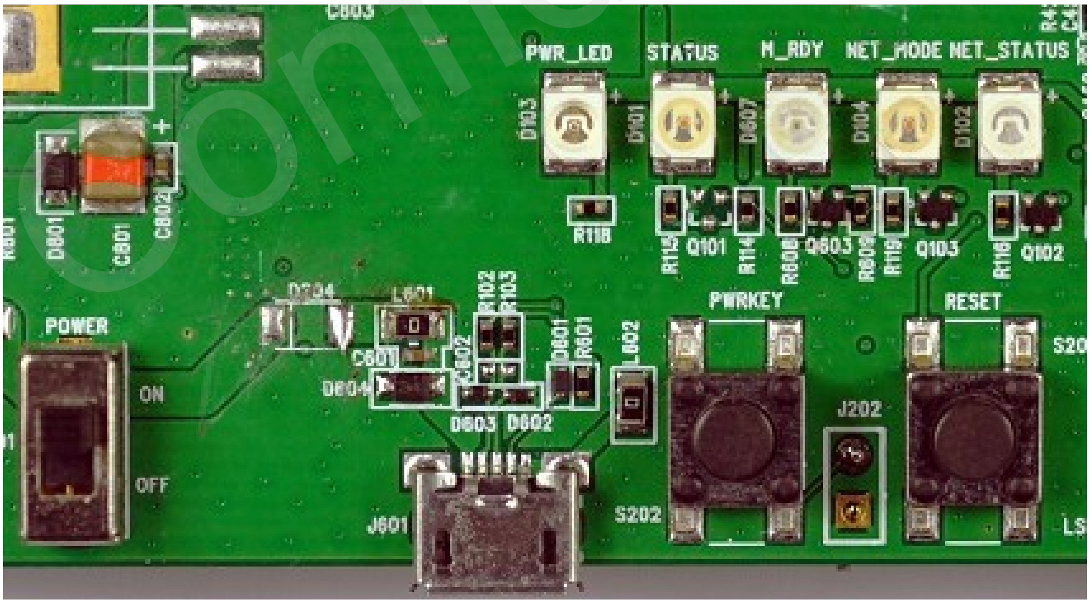


Figure 8: USB Interface

3.5. RS-232 Interface

UC20 EVB_V1.01 offers two RS-232 interfaces: COM1 (**MAIN UART**) and COM2. COM2 is reserved. The serial interface COM1 of the UC20 EVB_V1.01 is intended for the communication between UC20 module and the host application. The interface is a data and control interface for transmitting data and AT command.

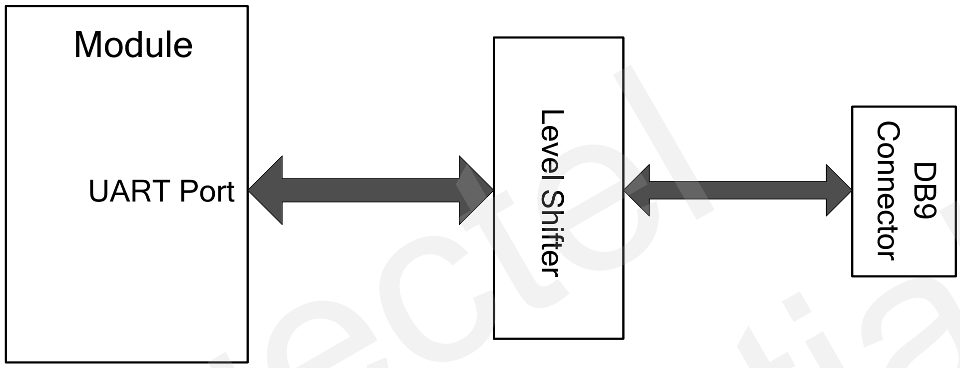


Figure 9: UART Block Diagram

Figure 10 shows the reference design of RS-233 level shifter.

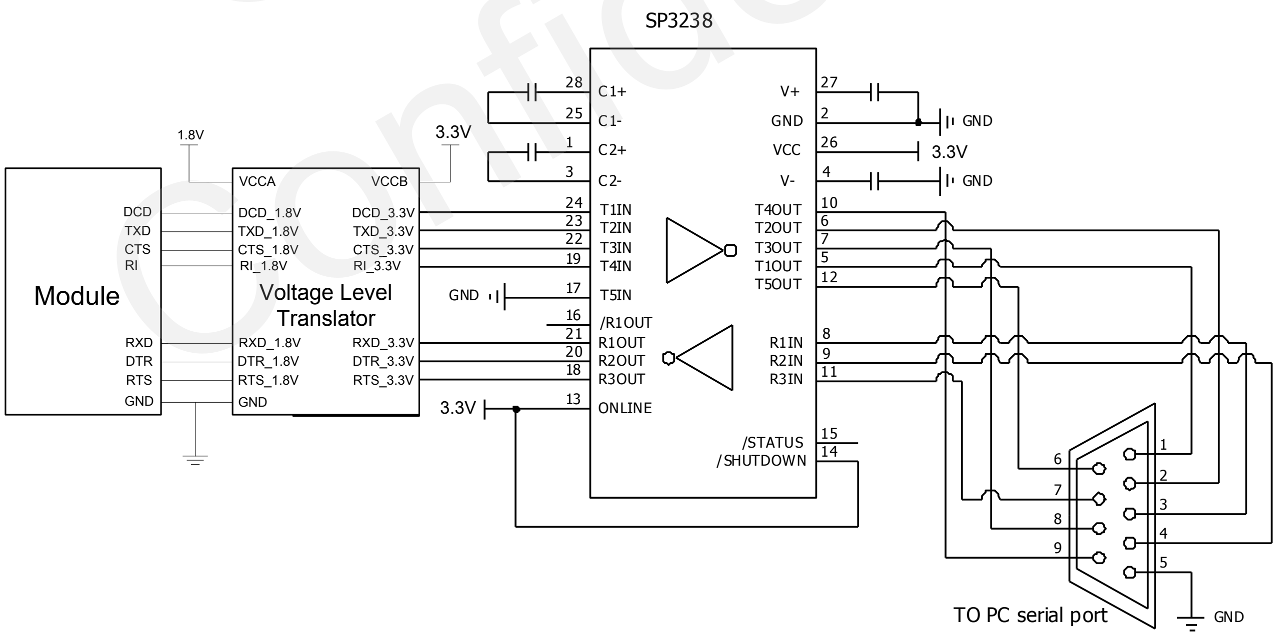


Figure 10: Level Match Circuit

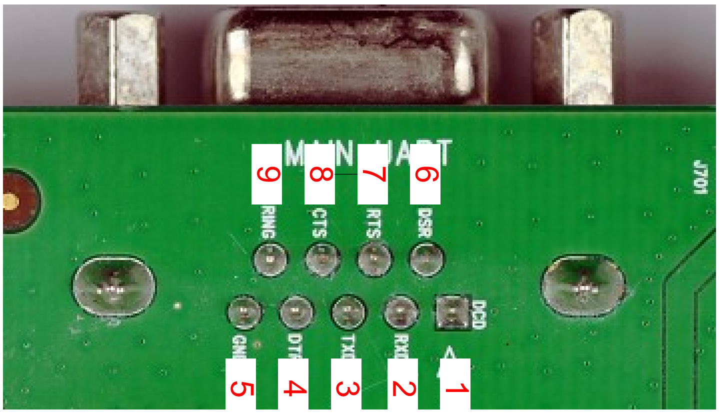


Figure 11: Main UART Port

Table 5: Pin Assignment-Main UART

Pin No.	Signal Name	I/O	Description
1	DCD	O	Data carrier detection
2	RXD	I	Receive data
3	TXD	O	Transmit data
4	DTR	I	Data terminal ready
5	GND	/	GND
6	NC	/	NC
7	RTS	I	Request to send
8	CTS	O	Clear to send
9	RI	O	Ring indicator

NOTE

These pins are RS232 voltage level.

3.6. Switch and Buttons

UC20 EVB_V1.01 comprises two buttons and one switch. Figure 12 shows the switch and buttons.

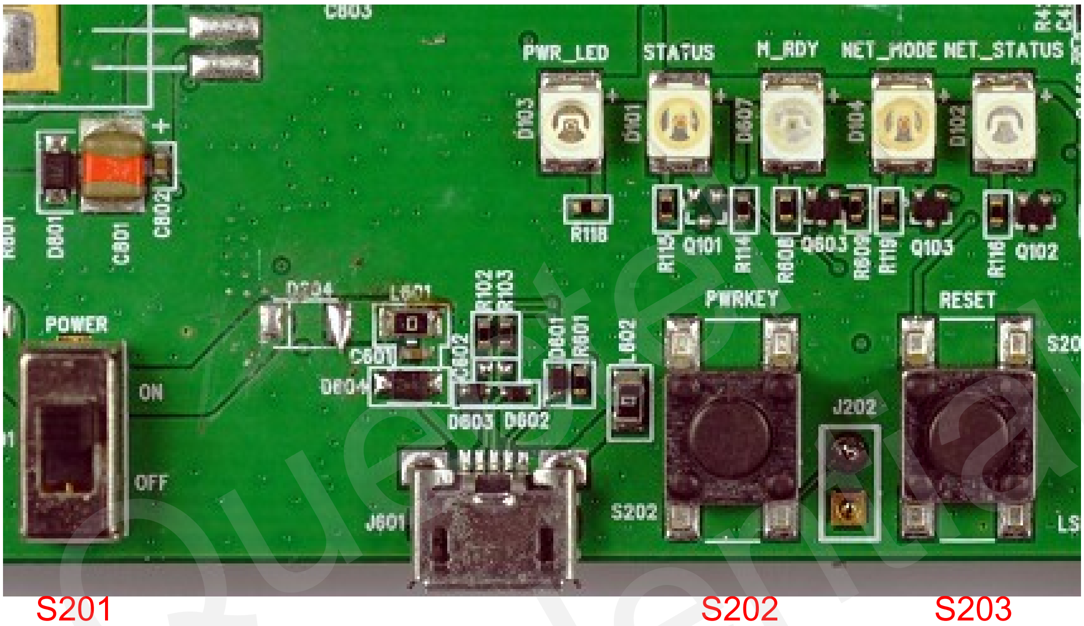


Figure 12: Switch and Buttons

Table 6: Functionality of switch and buttons

Reference	Functionality
S201	Power supply
S202	Turn on/off UC20 module
S203	Restart UC20 module

3.7. Status LEDs

UC20 EVB_V1.01 comprises several status LEDs. Figure 13 shows the position of LEDs.

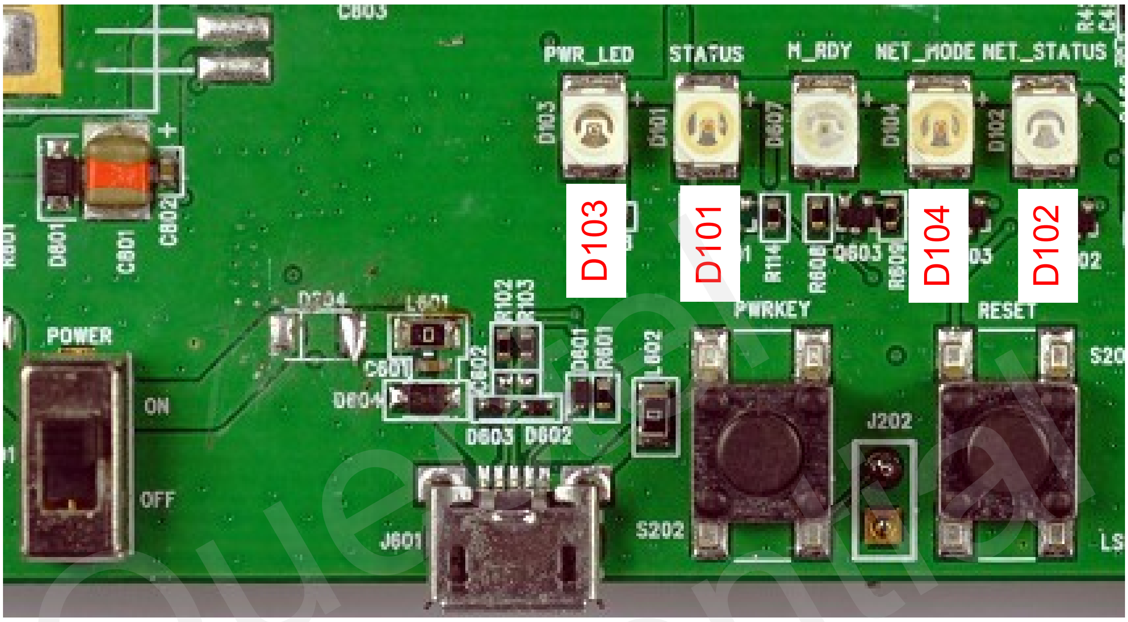


Figure 13: LEDs

Table 7: Description of LEDs

Reference	Description
D103	PWR_LED, power supply is ready.
D101	STATUS, indicates UC20 module is in ON or OFF status.
D104	NET_MODE, module works in 2G networks or 3G networks.
D102	NET_STATUS, indicate UC20 module's working status.

3.8. Analog Audio Interface

UC20 Module just provides digital audio interface (PCM). UC20 EVB_V1.01 equips an external audio codec called NAU8814, which transfer PCM to analogy signal. There is one analogy audio interface at UC20 EVB_V1.01. Analogy signal could be input and output via RJ11 or audio jack. Figure 14 shows audio codec circuit.

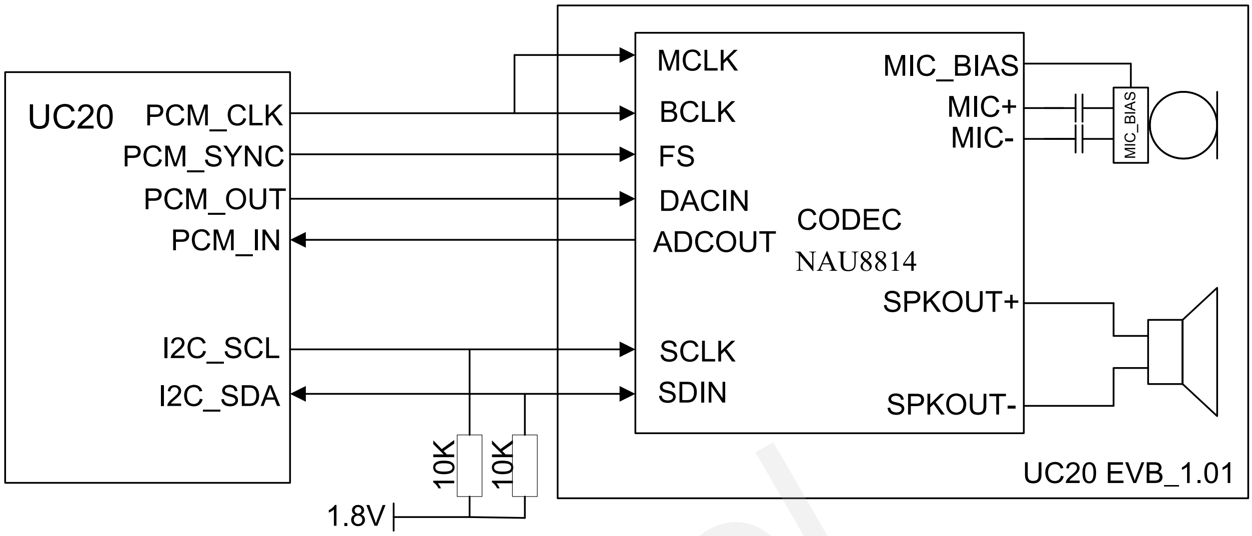


Figure 14: Audio Codec Circuit

4 Operating Procedure for UC20

4.1. Turn on UC20 Module

1. Connecting the UC20-TE-A module to the connector on UC20 EVB_V1.01, charging the 5V power adapter, pulling up **S201** to **ON** state, **D103** (PWR_LED) will be bright.
2. Pressing the **S202** (PWRKEY) for at least 100ms then release. The **D101** (STATUS) will be light and indicates power-on mode.
3. The **D102** (NET_STATUS) will be blinking at a certain frequency. The network status of the module can be judged by this LED. The working state of the Net Light is shown as below:

Table 8: State of NET_STATUS

State	Description
0.2s On/ 1.8s Off	The module is not synchronized with network.
1.8s On/ 0.2s Off	Idle mode.
0.125s On/ 0.125s Off	Data transfer is ongoing via GSM/3G network.
always on	Calling

NOTE

DC 5V adaptor is recommended for power supply and USB cable could be used as power supply as well (max current is 500 mA).

4.2. Turn off UC20 Module

There are several ways to turn off UC20 module.
One way to switch off the module is using the AT command AT+QPWD=1. It is best and safest approach. This procedure lets the module log off from the network and save data before it is shut down. The other way to switch off the module is pressing **S202** (PWRKEY) at least 0.5 second and release, the module will be shut down after then.

4.3. Reset

The emergency restart option is only used in the case of emergency. In this situation, due to serious problem, the software is not responding for more than 5 seconds.

Pulling down the module's **RESET_N** pin by pressing the key **S203** (more than 100ms) causes at release a reset of UC20 Module. This may cause the loss of information stored in the memory since the reset is initialized.

4.4. Communication via USB or Serial Port

1. Install USB drive at PC or Laptop.
2. Power on UC20 module, select communication port number as

   Qualcomm HS-USB AT Port 9003 (COM40).

3. Configure **AT Command Window**, correct baud rate and port.
4. Operate the module via AT commands.